

## EFFICACY OF COGNITIVE BEHAVIORAL THERAPY IN POST-TRAUMATIC STRESS DISORDER AMONG SPINAL CORD INJURY PATIENTS: A RANDOMIZED CONTROLLED PILOT STUDY

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### Abstract

Post-Traumatic Stress Disorder (PTSD) develops after exposure to or witnessing traumatic events. PTSD is very common among the Spinal Cord Injury (SCI) patients. PTSD can be successfully treated with the Cognitive Behavioral Therapy (CBT). However, CBT is mostly used in the western countries, so its efficacy in the eastern culture is still not fully known. Keeping this in view, the current study has determined the efficacy of CBT in the treatment of PTSD among the SCI patients in Pakistan. Using a Randomized Controlled Pilot Study design, data were collected through the Clinician-Administered PTSD Scale for DSM-5 from thirty patients admitted to the Paraplegic Center. Trauma-focused CBT(TF-CBT) protocol was applied through fourteen sessions. Data were analyzed by descriptive and multivariate statistics. Findings show that the level of PTSD symptoms gradually decreased from high at baseline (CAPS-5 Mean Scores  $\mu= 3.6$ ) to low during follow-up stage (CAPS-5 Mean Scores  $\mu= 0.89$ ). Results obtained from the present study on the efficacy of CBT are in concurrence with the research findings in other countries. This study supports the efficiency CBT intervention among Pakistani patients who had developed PTSD symptoms after suffering from SCI. Therefore, CBT can be widely used in the management of PTSD in Pakistan.

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**Keywords:** Post-Traumatic Stress Disorder, Spinal Cord Injury, Cognitive Behavioral Therapy, Treatment As Usual, Paraplegia

### Introduction

PTSD is a mental health condition, which is developed after exposure to or witnessing traumatic events (Bandelow et al., 2012). The modern history of PTSD could be traced back to World War I, when it was first termed as Shell Shock (Leese, 2002). PTSD was for the first time included in the Diagnostic and Statistical Manual of Mental Disorders-III during the 1980s (Regier, Kuhl, & Kupfer, 2013). PTSD has a broader symptomatology including experiencing distressed recollection of trauma (Jarero, Artigas, Uribe, & Miranda, 2014), hyper-vigilance, startle responses, nightmares, lack of concentration, and avoidance of traumatic thoughts (Rasmussen, Smith, & Keller, 2007).

Post-traumatic stress reactions can be developed by anyone; however, it is very common among those who have acquired SCI and majority of patients suffering from the SCI report acute symptoms of hyper-vigilance, avoidance, and intrusive trauma memories (Li, Reinhardt, & Feng, 2020). It is because the SCI is caused by severe traumatic events, like road accidents or gunshots in which the victims experience severe stress and shock (Patek & Stewart, 2020).

PTSD symptoms can be assessed through different screening and diagnostic tools, like for example, Checklist for DSM-V (Blevins, Weathers, Davis, Witte, & Domino, 2015) and Clinician-Administered PTSD Scale (Blake et al., 1995). Following the diagnosis, the treatment choices are both pharmacotherapeutic and psychotherapeutic, however, medical practitioners occasionally prefer psychotherapy, especially when the pharmacotherapy is not much effective (Lee et al., 2016). Among these common psychotherapeutic techniques, the Cognitive Behavioral Therapy is most widely used since it combines both cognitive and behavioral aspects for changing the painful thoughts and negative emotions (Beck, 2020).

The CBT is most widely used for the treatment of PTSD among the patients with SCI and its efficacy has been reported by various research studies, like for example Dorstyn, Mathias, & Denson (2011) found that with the twenty sessions of CBT, the symptoms of depression and overall stress were reduced among the patients admitted for spinal rehabilitation in Australia. Similarly, Flores, Linehan, Todd, & Hoffman (2018) conducted study on patients suffering from the Traumatic Spinal Cord Injury in Washington, United States. They found that after receiving ten sessions of Dialectical Behavioral Therapy, the symptoms of emotional upset, avoidance, painful memories, anger, guilt, anxiety, and depression were improved. Most recently, Andersen et al (2021) conducted a Randomized Controlled Multicenter Trial in Denmark on the patients suffering from the spinal injury with symptoms of traumatic stress. The patients received TF-CBT for ten weeks and after the end of treatment, there was much improvement in the both physical and

psychological symptoms. However, most of the previous research on the efficacy of CBT among SCI patients has been conducted in the developed western countries and there is a lack of research in underdeveloped Asian countries. This fact is also highlighted by a very recent meta-analysis by Fordham et al (2021) on the applicability of CBT in various medical conditions. The findings of this meta-analysis revealed that it is still not fully known whether CBT is equally efficacious among patients in Asian and African countries.

Keeping in mind the overall paucity of research on the efficacy of CBT in the treatment of PTSD among the SPI patients in Asian countries, the current study aims at determining the efficiency of CBT among the SPI patients in Pakistan. This study was conducted at the Paraplegic Centre, Peshawar, Pakistan. The Paraplegic Centre is an autonomous healthcare organization, operating under the Health Department of Government of Khyber Pakhtunkhwa, Pakistan. It provides Comprehensive Physical Rehabilitation Services, like, Physiotherapy, Psychotherapy, Orthotic Management, and Community Reintegration for the people suffering from the Traumatic Spinal Cord Injuries.

## **Methods**

### *Research Design*

The current study was a two-group Randomized Controlled Pilot Trial with an allocation ratio of 1:1. Such design is cost and time effective, since it helps in knowing whether the particular study is feasible and can be conducted at large scale (Eldridge, Lancaster, et al., 2016). This study was carried out according to the Extended Statement of Consolidated Standards of Reporting Trials for Randomized Pilot and Feasibility Trials (Eldridge, Chan, et al., 2016).

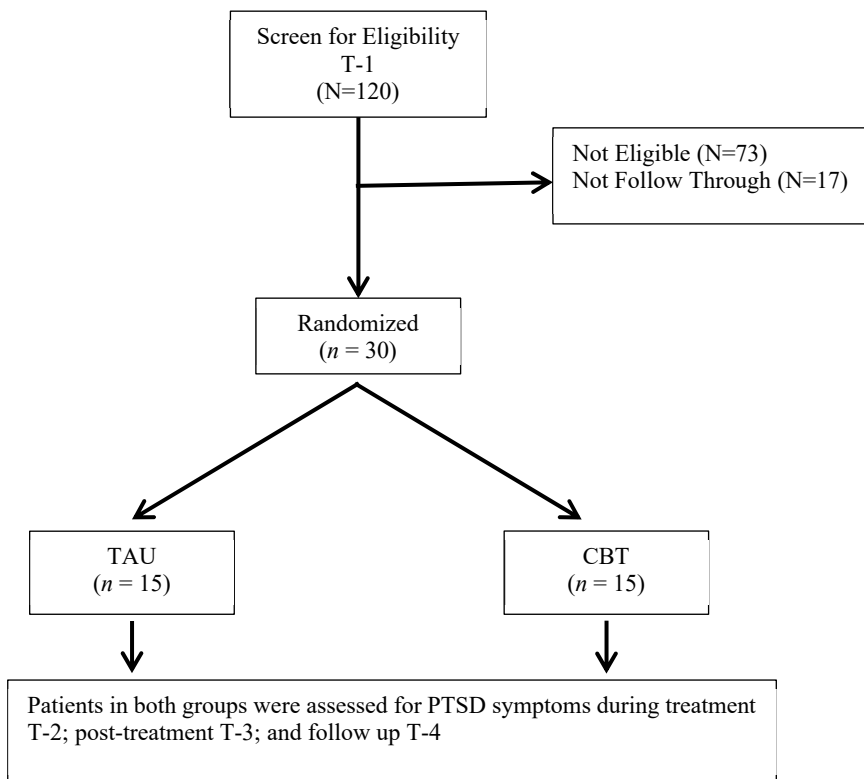
### *Participants Selection*

This study was conducted at the Paraplegic Centre (<https://paraplegiccenter.org/index.php>), Peshawar, Pakistan. The participants were patients suffering from the spinal injuries, having paraplegia or tetraplegia. At that time, the Paraplegic Centre had a capacity of accommodating up to sixty indoor patients. Researchers have proposed certain rules of thumb for the selection of respondents, like for example, Kieser & Wassmer (1996) have recommended that twenty to forty respondents could be selected for a typical pilot study. Therefore, to select thirty eligible patients, a Consecutive Sampling Technique (with a rolling recruitment strategy) was applied. The Consecutive Sampling Technique can help the researchers in choosing every consecutive patient, till the required number of patients are selected (Mathieson, 2014). All consecutive indoor patients that had visited the Paraplegic Centre for treatment during the months of July and August 2020 were initially screened for symptoms of PTSD and upon meeting the basic PTSD

diagnostic criteria, the patients were recruited for the study. The indoor patients were screened until the required number (that is thirty) of patients were selected.

## Randomization

All eligible patients were randomly allocated either to the CBT group or to the Treatment As Usual (TAU) group by using an allocation ratio of 1:1, as shown in Figure 01. Randomization was done by using a computer-Generated Random Digits Table, whereas this randomization was concealed.



**Figure 1.** CONSORT flow chart

## PTSD Screening Tool

The symptoms of PTSD were screened with the help of Clinician-Administered PTSD Scale-5 (CAPS-5) (Weathers et al., 2013).

### *Data Collection*

All selected patients completed CAPS-5 during the pre-post and follow up treatment stages. Preliminary data on the symptoms of PTSD were collected during the initial screening (pretreatment T-1 screening). In the next step, data were collected during the mid of treatment (during treatment T-2 assessment). After the completion of treatment, patients were assessed for the PTSD symptoms (post-treatment T-3 assessment). Finally, patients were assessed for the presence of PTSD symptoms after two months (follow up assessment T-4). Moreover, during pretreatment T-1 screening, demographic information on age, gender, marital status, educational level, disability type and cause of injury were also collected.

### *Treatments*

The first group of fifteen patients received CBT according to the severity of PTSD symptoms. Two Clinical Psychologists, certified in CBT, provided psychotherapeutic treatment. The treatment duration ranged up to fourteen sessions (one session per week). The Clinical Psychologists had adopted the CBT protocol recommended by Mueser et al (2008) and Cohen, Mannarino, Kliethermes, & Murray (2012). The protocol had following modules:

1. Introduction (one session).
2. Crisis Plan Review (one session).
3. Psycho-education, Part one (Core symptoms of PTSD) (one session).
4. Breathing Retraining (one session).
5. Psycho-education, Part two (Associated symptoms of PTSD) (two sessions).
6. Cognitive Restructuring, Part one (Common styles of thinking) (one session).
7. Cognitive Restructuring, Part two (Five Steps of Cognitive Restructuring) (five sessions).
8. Generalization Training and Termination (two sessions).

The second group of fifteen patients was assigned to the TAU group. This group did not receive any psychotherapeutic treatment for their PTSD symptoms and received usual services and medical care, including supportive counseling and pharmacotherapy. The TAU group entire length of involvement in this trial was fourteen weeks.

### *Data Analysis*

Data analysis were performed by using SPSS version 21 for windows. Missing data and dropout analyses were carried out. For this purpose, per protocol analysis was initially carried out to know that no participants violated the inclusion criteria. Second, Intention to treat analysis was performed to know that all participations are included in the analysis and there are no missing data. To know

the percentage and randomness of missing data, the Little's Test for Missing Data Completely at Random (Little, 1988) was run.

A General Linear Model Repeated Measures of ANOVA (GLM RM-ANOVA) was used to determine the effect of time over the PTSD symptoms and to examine the group differences. The Assumption of Sphericity was checked through examining the Mauchly's test of Sphericity, which should be non-significant at  $p > 0.05$  (Verma, 2015). The results regarding change in PTSD symptoms were shown by reporting Means, Standard Deviations and F-test values with  $p < 0.05$  considered statistically significant. The F-test values were selected by checking the Epsilon. If the Epsilon is  $> 0.75$ , then Huynh-Feldt Correction should be selected and in case if it is  $< 0.75$ , then Greenhouse-Geisser Correction should be selected (Field, 2013).

Moreover, planned post hoc analyses were performed with Bonferroni Correction for determining the significant differences between the pre and post treatment PTSD symptoms levels. Finally, a series of paired t-test were performed to know the trends of changes in the PTSD symptoms from the baseline (T-1), during treatment (T-2), post treatment (T-3) and follow-up (T-4) stages. Finally, Effect sizes (Cohen's d) were calculated from the means and standard deviations of pre to post and pre to follow up stages.

### *Treatment Fidelity*

Treatment Fidelity comprises of Adherence to the selected treatment protocol and Competence in implementing the treatment procedure (Wilczynski, 2017). Adherence to the treatment protocol was qualitatively examined through a Delphi Technique. For this purpose, three CBT experts were selected and video recordings along with interview questions were mailed to them. The interview questions were designed according to the CBT for PTSD Fidelity Scale by Lu et al (2012) and Trauma-Focused CBT Practice Checklist by University of Washington (2008). Whereas a self-report rating scale for competence in CBT (Liu et al., 2020) was used to assess the therapist competence in CBT. This scale was given to the therapists for rating their competence level.

### *Ethical Approval*

Ethical approval was taken from the Paraplegic Rehabilitation Center, vide letter No: Para/Khushal-Khan-Uni/2019/178, Dated 30<sup>th</sup> January 2019. Furthermore, personal consents were also taken from the participants. The study protocol was approved by the Ethical Review Committee of the Khushal Khan Khattak University, Karak, Pakistan vide notification No: 230/ORIC/Research/KKKUK/19, Dated 31<sup>st</sup> January 2019. Later, the initial study protocol was published, for details see Khan, Khan, & Shah (2019).

## Results

### *Dropout and Missing Data Analysis*

The per protocol analysis revealed that none of the participants violated the following inclusion criteria:

1. Participants should be within age of 15 to 60 years, that is, neither too young nor too old.
2. Participants should be able to move hands and eyes, that is, perform basic movements.
3. Participants should meet the basic screening criteria of PTSD.
4. Participants should not have severe intellectual impairments.

Moreover, results obtained from Little's Test for Missing Data Completely at Random revealed that there were no missing data.

### *Demographic Characteristics*

Both groups matched on all demographic characteristics. The average age for CBT group was  $34.55 \pm$  years, whereas it was 36.33 for the TAU group. Majority of the participants were males (80% vs 87%), and married (60% vs 47%). Education wise, majority of the respondents had Intermediate level education (47% vs 53%). Finally, results regarding the disability type and cause of injury showed that majority of the respondents were suffering from Paraplegia (80% vs 87%), and most of the respondents were injured due to road accidents (60% vs 73%).

**Table 1.** Baseline Demographic Characteristics of Participants

<b>Sociodemographic Features</b>	<b>CBT Group (n=15)</b>	<b>TAU Group (n=15)</b>
Sex		
Males	12 (80%)	13(87%)
Females	03 (20%)	02 (13%)
Marital Status		
Unmarried	05 (33%)	04 (27%)
Married	09 (60%)	07 (47%)
Divorced	01 (7%)	02 (13%)
Widowed	00 (00%)	02 (13%)
Education		
Matriculation	03 (20%)	03 (20%)
Intermediate	07 (47%)	08 (53%)
Bachelors	02 (13%)	03 (20%)
Uneducated	03 (20%)	01 (7%)
Disability Type		
Paraplegia	12 (80%)	13 (87%)
Tetraplegia	03 (20%)	02 (13%)
Causes of Injury		
Road Accidents	09 (60%)	11 (73%)
Falling	02 (13%)	01 (7%)
Gunshot or stabbing	04 (27%)	03 (20%)

*Treatment Fidelity*

Results regarding Adherence to the treatment protocol revealed that the three experts gave positive opinions regarding the treatment sessions. Expert opinions on each treatment step are mentioned below:

1. *Part 01: Assessment and Engagement:* The therapists had successfully assessed the PTSD symptoms, determined the context within which trauma was rooted and established the treatment goals.
2. *Part 02: Psycho-education:* The therapists had explained the symptoms and other information about PTSD to the patients, described the components & structure of TF-CBT and explained how TF-CBT works.
3. *Part 03: Parenting (Caregiver):* The therapists had shown good relationships with the patients by applying a positive parenting style.
4. *Part 04: Relaxation:* The therapists had successfully created awareness about the capacity to change from state of distressed to state of relaxation. Moreover, they had taught specific skills for calming and reducing distress.
5. *Part 05: Affective Modulation:* The therapists had taught the Cognitive Triangle by explaining the connection between Thoughts, Feelings, and Behavior. Moreover, they had identified feelings associated with the traumatic events and also normalized the conflicting feelings
6. *Part 06: Cognitive Coping:* The therapists had taught the CBT Triangle and helped the patients to successfully learn and identify the automatic unhelpful thoughts, which the patients may not be aware of but such thought might be causing distress.
7. *Part 07: Trauma Narrative:* The therapists had helped the patients to think about the different aspects of trauma, identify the inaccurate trauma associated cognitions, and identify more accurate ways to think about the traumatic exposure.
8. *Part 08: In-Vivo Exposure:* The therapists had helped the patients to separate harmless conditioned fear responses from real danger. Moreover, reduce avoidance, which might interfere with the daily functioning. The therapists had used incentives and rewards during sessions.
9. *Part 09: Assign Homework:* The therapists had assigned homework to the patients
10. *Part 10: Enhancing Safety:* The therapists had created a safety plan for helping the patient to be safer in ongoing or future dangers. Taught patients about the safety skills for use in ongoing or future risky situations and developed a specific safety plan for the patients to deal with deliberate self-harm or suicidal thoughts.



Results regarding the competence in CBT revealed that all the therapists possessed the required competence for the successful implementation of the CBT protocol, as clear from the mean scores on each dimension of the competence scale, as shown in Table 5.

**Table 5.** Scores on Competence in CBT

Competence Dimensions	Mean Scores on Five Points Scale
Possessing Generic Psychotherapy Competences	4.1
Master in Common CBT Theory	4.2
Master in Basic CBT Techniques	4.0
Skills in Formulating Patients' Problems and Plans	4.0
Using CBT Techniques Properly	4.3

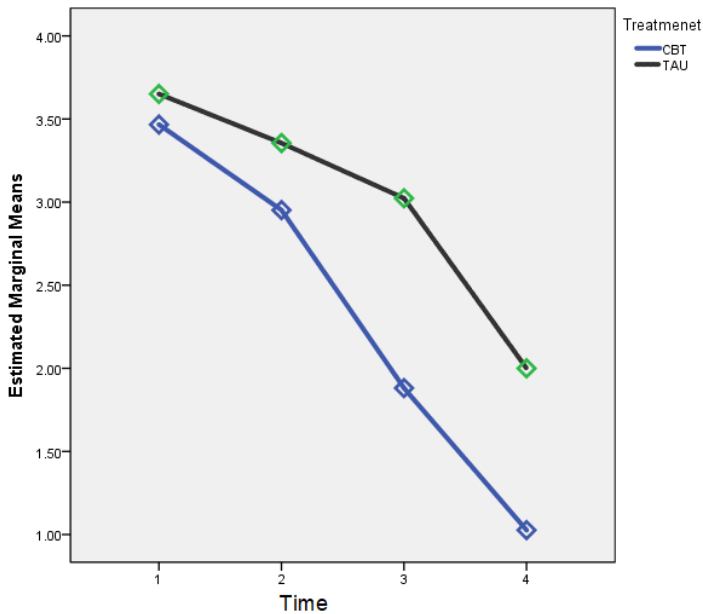
### *Efficacy of CBT in PTSD*

To know whether CBT is efficacious (in comparison with TAU) in reducing the symptoms of PTSD over time, a GLM RM-ANOVA was run. Results of GLM RM-ANOVA examining the group differences in the mean score of CAPS-5 at pre, mid, post and follow up stages are presented in Table 6. It is clear that patients in the CBT group, when compared with those in TAU group, had significantly lower CAPS-5 scores at post treatment (T-3) and follow up (T-4) stages. The between group effect sizes (Cohen's d) for CAPS-5 scores in CBT group are higher as compared to that of TAU group. The higher effect sizes of the CBT group indicates that CBT intervention is more efficacious.

**Table 6.** Group differences in mean score of CAPS-5

Outcome	Groups	(T1) Baseline	(T2) Mid	(T3) Post	(T4) Follow up	Cohen's d (T1 to T2)	Cohen's d (T3 to T4)
CAPS-5	CBT	3.467	2.952	1.813	1.026	2.04	4.05
	TAU	3.650	3.553	3.023	2.011	1.53	3.90

Similarly, the Estimated Marginal means of CAPS-5 (CBT vs TAU) shows that the CAPS-5 mean scores were high during Baseline (T1) in both groups, however, it decreased significantly during the Post Treatment (T3) and Follow Up (T4) stages in the CBT group, as clear from Figure 1.



**Figure 1.** Estimated Marginal means of CAPS-5 (CBT vs TAU)

The effect of treatment (with passage of time) is also visible from the results of RM-ANOVA, which shows that the means CAPS-5 scores differed significantly across the four times points [ $F(3, 84) = 650.635, p = 0.000$ ]. The RM-ANOVA also yielded a significant interaction effect between time and treatment groups [ $F(3, 84) = 41.99, p = 0.000$ ], showing that the means CAPS-5 scores were significantly reduced in both treatment groups. This change was homogenous and Mauchly's test of Sphericity was not violated. Moreover, planned post hoc analyses with Bonferroni Correction showed significant group differences in the CAPS-5 scores with lower CAPS-5 score in the CBT group during follow up ( $M = 1.02, SD = 0.122$ ) as compared to TAU group ( $M = 2.012, SD = 0.287$ ). The mean differences across groups also changed and was reordered high in the CBT group ( $MD = 2.44$ ) as compared to TAU group ( $MD = 1.65$ ). Such differences were significant at  $p = 0.000$ .

**Table 7.** Trends of Changes in PTSD symptom across groups

Treatment Groups	Time Period	Mean Difference	Std. Deviation	t	df	Sig Level
CBT	T1 – T4	2.44000	0.27764	34.037	14	0.000
TAU	T1 – T4	1.65067	0.28704	22.272	14	0.000

Note: Detailed results are attached as Appendix.

## Discussion

PTSD is a lifelong condition and its symptoms may re-appear even after the completion of treatment (Lewin et al., 2019). PTSD can badly impair the daily life functioning of individuals. The treatment choices are either pharmacotherapeutic or psychotherapeutic, however, psychotherapy is often preferred in a situation when the pharmacotherapy is not effective (Lee et al., 2016). While opting for psychotherapy, the CBT is most widely used because it combines both cognitive and behavioral aspects that help in changing the painful thoughts and negative emotions (Beck, 2020).

The current Randomized Controlled Pilot Study aimed at determining the efficacy of CBT in the treatment of PTSD symptoms among the victims of Spinal Cord Injury in Pakistan. Findings of this study revealed that the CBT is an effective treatment choice (in comparison with TAU) for the victims of Spinal Cord Injury in Pakistan. The details suggest that patients in the CBT group reported significant reduction in the level of PTSD symptoms as compared to the patients in the TAU group. Moreover, patients in the CBT group showed satisfaction with the fourteen weeks treatment and remained adhered to the treatment. The positive effects of CBT could have been due to the role of cognitive restricting of negative thoughts, besides, CBT also combines both cognitive and behavioral aspects for changing the painful thoughts (Beck, 2020).

Such findings are in concurrence with the existing research findings on the efficacy of CBT in other countries. For example, recently a research study was conducted in Germany on the efficacy of CBT in treating the PTSD symptoms among women. Findings of this study supported the efficacy of CBT in the treatment of complex PTSD symptoms (Bohus et al., 2020). Similarly another recent study by Andersen et al (2021) found that patients suffering from spinal injury with symptoms of traumatic stress received TF-CBT for ten weeks and after the end of treatment, there was much improvement in both physical and psychological symptoms. These findings are consistent with the assumptions of Cognitive Theories, which posits that trauma associated thoughts underlie the PTSD symptoms (Brewin & Holmes, 2003).

Results obtained from the current pilot study and those of previous studies have yielded important insights about the nature and course of PTSD symptomology. Moreover, it has also helped in understanding the psychotherapeutic mechanism of CBT through which PTSD could be diagnosed and ultimately treated. The fact is that CBT changes the negative trauma associated thoughts, which ultimately helps in improving PTSD symptoms. This all happens in a proper sequence. In the first four to five sessions, CBT focuses on the assessment and education that helps the patients to know the nature of their problem. After this, the Cognitive Restructuring is achieved, which help in the rational rebuttal of maladaptive thoughts.

This pilot study has certain strengths. First, the current study used a randomized controlled pilot study design with clearly defined outcomes and to the

best of our knowledge, it is the first ever study in Pakistan to assess the efficacy of CBT among the Spinal Cord Injury patients. Findings of this study supports the feasibility of CBT interventions in the treatment of PTSD symptoms among Spinal Cord Injury patients in the Khyber Pakhtunkhwa province of Pakistan. Such findings can be generalized to a wider Spinal Cord Injury population in the rest of provinces of Pakistan. Second, this study has applied a rigorous research methodology, with homogenous sample and standardized CBT-TF protocol, whereas fidelity of this protocol was determined, and data was collected with validated PTSD diagnostic tool. All such effects have increased the reliability and validity of the results of this study.

### **Implications, Limitations and Recommendations**

Experimental research on the evidence-based treatments for addressing the PTSD among the victims of SCI is critically important. Findings obtained from the current study will be a valuable addition into the existing literature, since previously, a smaller number of studies have been published on the PTSD symptomology among SCI patients in Pakistan. Moreover, findings of the current study will empirically contribute to the existing clinical practice in Pakistan. In this way, the overall understanding about the efficacy of CBT in Pakistan will be improved.

As a whole, findings of the current study are important to the researchers in the field of Clinical Psychology, as they can understand the theoretical and empirical technicalities involved in the experimental research on the efficacy of evidence-based treatments in Pakistan. Findings of this study are also important to the administrator of rehabilitation centers and policy makers in the health sector of Pakistan, since they can understand the significance of evidence-based treatments in Pakistan. The administrators and policy makers can devise policies for the successful implementation of evidence based psychological treatments in Pakistan.

Despite the major implications of this study, there are certain limitations that need to be addressed. First, the current study was basically a Randomized Controlled Pilot Trial, and it was conducted among a limited number of participants. Future researchers can conduct a full-fledged Randomized Controlled Trial on a relatively larger sample. Second, due to time constraints, the numbers of psychotherapeutic sessions were limited to fourteen sessions per each participant, which may affect our understanding about the overall efficacy of CBT, especially if there are treatment resistant cases. Future researchers should conduct more than fourteen sessions and check whether the efficacy of CBT enhances by increasing the number of psychotherapeutic sessions. Third, the baseline (T1) assessment was done at one time point, which may lead to the overestimation due to the regression of scores to the mean of high scores of CAPS-5. Finally, the diagnostic tool, i.e., CAPS-5 was in English, which might have caused problems to those participants that were having

low English proficiency. Future researchers can work on developing locally adapted and translated versions of CAPS-5.

## Conclusion

Findings obtained from this study have provided valuable insights regarding the efficacy of CBT in addressing PTSD among SCI patients in Pakistan. This study shows that even severe symptoms of PTSD (i.e., CAPS-5 mean score of 3.467) can be effectively treated with CBT. It is therefore concluded that CBT is an effective evidence based psychotherapeutic intervention in Pakistan and it can be widely used in the management of PTSD and other disorders like Depression and Anxiety in Pakistan. This conclusion is supported by the conclusions of recently published studies, like, Surkan et al (2020) and Latif et al (2021) on the efficacy of CBT in treatment of PTSD, Anxiety, and Depression in Pakistan.

## Funding

This research has been funded by the EMDR Research Foundation, USA.

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## Appendix

**Table 1.** Multivariate Tests For Determining Relationship of Time and Treatment

	Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Time	Pillai's Trace	.984	548.776 <sup>b</sup>	3.000	26.000	.000	.984
	Wilks' Lambda	.016	548.776 <sup>b</sup>	3.000	26.000	.000	.984
	Hotelling's Trace	63.320	548.776 <sup>b</sup>	3.000	26.000	.000	.984
	Roy's Largest Root	63.320	548.776 <sup>b</sup>	3.000	26.000	.000	.984
Time * Treatment	Pillai's Trace	.831	42.743 <sup>b</sup>	3.000	26.000	.000	.831
	Wilks' Lambda	.169	42.743 <sup>b</sup>	3.000	26.000	.000	.831
	Hotelling's Trace	4.932	42.743 <sup>b</sup>	3.000	26.000	.000	.831
	Roy's Largest Root	4.932	42.743 <sup>b</sup>	3.000	26.000	.000	.831

**Table 2.** Mauchly's Test of Determining Sphericity and Randomness of Variance

Measure: MEASURE_1							
Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Greenhouse-Geisser	Epsilon <sup>b</sup> Huynh-Feldt	Lower-bound
Time	.749	7.716	5	.173	.869	1.000	.333

**Table 3.** Post Hoc Analysis for Determining Mean Difference Between Groups

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	72.268	3	24.089	650.635	.000	.959
	Greenhouse- Geisser	72.268	2.608	27.706	650.635	.000	.959
	Huynh-Feldt	72.268	3.000	24.089	650.635	.000	.959
	Lower-bound	72.268	1.000	72.268	650.635	.000	.959
Time * Treatment	Sphericity Assumed	4.665	3	1.555	41.998	.000	.600
	Greenhouse- Geisser	4.665	2.608	1.788	41.998	.000	.600
	Huynh-Feldt	4.665	3.000	1.555	41.998	.000	.600
	Lower-bound	4.665	1.000	4.665	41.998	.000	.600
Error(Time)	Sphericity Assumed	3.110	84	.037			
	Greenhouse- Geisser	3.110	73.034	.043			
	Huynh-Feldt	3.110	84.000	.037			
	Lower-bound	3.110	28.000	.111			